

CLAIMS

WHAT IS CLAIMED IS:

1. An electronic equipment having at least a communication function, comprising:

a printed-circuit board on which at least one antenna element pair including two chip-like antenna elements, each of which transmits and/or receives a linearly polarized signal and which are disposed along axes orthogonal to each other, and various modules for realizing various functions are mounted, wherein

each of the antenna elements has a thin plate shape having a rectangular section, an open end is formed by at least two antenna conductors separated from each other; and

a ground required by one or plural other modules is disposed to surround a surrounding area of at least three sides of four sides forming the rectangular section in each of the antenna elements, and the antenna elements are disposed and mounted so that a remaining one side of the four sides forming the rectangular section in each of the antenna elements faces an edge portion of the printed-circuit board.

2. An electronic equipment according to claim 1, wherein the two antenna elements constituting the antenna element pair respectively transmit and/or receive linearly polarized signals different from each other in polarization plane.

3. An electronic equipment according to claim 2, wherein the two antenna elements constituting the antenna element pair respectively transmit and/or receive linearly polarized signals in which polarization planes are orthogonal to each other.

4. An electronic equipment according to claim 1, wherein

one of the two antenna elements constituting the antenna element pair

transmits and/or receives a first linearly polarized signal, and

the other antenna element transmits and/or receives a second linearly polarized signal different from the first signal in phase by 90°.

5. An electronic equipment according to claim 1, wherein the at least two antenna conductors are separated from each other in a height direction.

6. An electronic equipment according to claim 1, wherein each of the two antenna elements constituting the antenna element pair is constructed such that a conductor pattern having a three-dimensional structure is formed in a specified resin substrate.

7. An electronic equipment according to claim 6, wherein each of the two antenna elements constituting the antenna element pair, the conductor pattern is formed such that plural antenna conductors are connected to each other to enable electrical conduction through one or plural through holes which are provided to be bored through the resin substrate from a front surface to a back surface and whose insides are coated with copper foils.

8. An electronic equipment according to claim 7, wherein each of the two antenna elements constituting the antenna element pair, the plural antenna conductors are connected to form a meandering shape through the one or plural through holes so that the conductor pattern is formed.

9. An electronic equipment according to claim 6, wherein the resin substrate is made of a glass cloth epoxy substrate.

10. An antenna mounting printed-circuit board which is incorporated in an equipment having at least a communication function and on which various modules for realizing various functions are mounted, comprising:

at least one antenna element pair in which two chip-like antenna elements

each transmitting and/or receiving a linearly polarized signal are disposed along axes orthogonal to each other;

a ground which is disposed to surround a surrounding area of at least three sides of four sides forming a rectangular section in each of the antenna elements each having a thin plate shape with a section of a rectangular shape and is required by one or plural other modules, are mounted; and

an open end of each of the antenna elements is formed of at least two antenna conductors separated from each other, and a remaining one side of the four sides forming the rectangular section is disposed to face an edge portion of the printed-circuit board.

11. An antenna mounting printed-circuit board according to claim 10, wherein the two antenna elements constituting the antenna element pair respectively transmit and/or receive linearly polarized signals different from each other in polarization plane.

12. An antenna mounting printed-circuit board according to claim 11, wherein the two antenna elements constituting the antenna element pair respectively transmit and/or receive linearly polarized signals in which polarization planes are orthogonal to each other.

13. An antenna mounting printed-circuit board according to claim 10, wherein

one of the two antenna elements constituting the antenna element pair transmits and/or receives a first linearly polarized signal, and

the other antenna element transmits and/or receives a second linearly polarized signal different from the first signal in phase by 90°.

14. An antenna mounting printed-circuit board according to claim 10,

wherein the at least two antenna conductors are separated from each other in a height direction.

15. An antenna mounting printed-circuit board according to claim 10, wherein each of the two antenna elements constituting the antenna element pair is constructed such that a conductor pattern showing a three-dimensional structure is formed in a specified resin substrate.

16. An antenna mounting printed-circuit board according to claim 15, wherein each of the two antenna elements constituting the antenna element pair, the conductor pattern is formed such that plural antenna conductors are connected to each other to enable electrical conduction through one or plural through holes which are provided to be bored through the resin substrate from a front surface to a back surface and whose insides are coated with copper foils.

17. An antenna mounting printed-circuit board according to claim 16, wherein each of the two antenna elements constituting the antenna element pair, the plural antenna conductors are connected to form a meandering shape through the one or plural through holes so that the conductor pattern is formed.

18. An antenna mounting printed-circuit board according to claim 15, wherein the resin substrate is made of a glass cloth epoxy substrate.